

**PATENT****REMARKS**

Claims 1-21 are currently pending in this application. Reconsideration is respectfully requested in light of the following remarks.

The Examiner rejected claims 1-7, 10-12 and 14-20 under 35 U.S.C §103(a) as being obvious in light of U.S. Patent 6,738,669 to Sloman et al. in view of U.S. Patent 6,976,967 to Dahl et al. Applicant respectfully traverses this rejection.

Applicants' claimed invention as recited in independent claims 1 and 15 is directed towards a method and corresponding apparatus for determining a parameter related to cardiac geometry. For example independent claim 1 recites a method comprised in part by delivering an electrical signal to a first position ... sensing a potential generated by the delivered electrical signal at a second position and determining a parameter related to cardiac geometry based, at least in part, on the sensing. (Underlining added for emphasis only). Applicants respectfully submit that the cited references, alone or in combination, do not disclose or suggest the recited claim elements.

Rather Sloman et al. disclose a system and method for automatically detecting capture of a ventricular chamber in a multi-chamber cardiac stimulation device. Ventricular capture is detected by sensing the far-field R-wave that follows a ventricular stimulation pulse that has successfully captured the ventricle. Thus, Sloman et al. simply very capture of a first chamber in response to a stimulation pulse by measuring a far-field response of that pulse. Sloman et al. do not however disclose or in any way suggest determining a parameter related to cardiac geometry based at least in part on potentials sensed at a second position in response to electrical signals delivered to a first position as recited Applicants' claimed invention. (Sloman et al., col. 4, line 65 – col. 5, line 2).

Further, as the Examiner notes, Dahl et al. disclose a method for sensing spatial displacement in a heart that includes receiving a signal transmitted from a lead disposed proximate a structure of a heart and determining a change in a dimension of the heart, due to the heart beating, based upon the signal. (Dahl et al., FIG. 9, col. 6,

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lines 26-33). However, Dahl et al. further teach that a change in the dimension of the heart can be determined as a function of the change in flexure in the lead (see FIG. 10).

For example, Dahl et al. disclose that the leads may include one or more sensing elements capable of sensing bending stress induced in the leads (see FIGS. 5 and 6). In one embodiment, the sensing elements include a plurality of strain gauges which output a voltage that corresponds to the direction and amount of flexing in the leads which is then processed to determine the spatial displacement of the heart. (Dahl et al., col. 4, line 65 – col. 5, line 16). Alternatively, Dahl et al. disclose the sensing elements may comprise piezoelectric elements (see FIG. 7) which produce a signal that is proportional to the flexure of the lead or ultrasonic elements which determine changes in the spatial displacement of the heart as a function of the changes in a signal transmitted from one ultrasonic element to another ultrasonic element. (Dahl et al., FIG. 8, col. 6, lines 3-10). Thus, Dahl et al. determine geometric changes in a heart based upon flexures in a cardiac lead or through ultrasonic measurements.

However, neither Sloman et al. or Dahl et al., alone or in combination, disclose or in any way suggest determining a parameter related to cardiac geometry based at least in part on potentials sensed at one position in response to electrical signals delivered to at a different position as recited Applicants' claimed invention. Accordingly, Applicants respectfully submit that claims 1 and 15 are novel and unobvious over Sloman et al. and Dahl et al. and are therefore allowable. Applicants further submit that claims 2-7 and 10-12 and claims 16-19 that depend from claims 1 and 15 respectively are allowable as are claims 1 and 15 and for additional limitations recited therein.

Independent claim 19 recites similar limitations. For example, independent claim 19 recites an implantable cardiac system comprised in part by circuitry that is operative to deliver an electrical signal to a first electrode position in or adjacent to a cardiac chamber, sense a potential generated by the delivered electrical signal at a second electrode position, and determine a parameter based, at least in part, on the sensing wherein the parameter relates to cardiac geometry. Applicants respectfully submit that neither Sloman et al. nor Dahl et al. disclose or suggest the recited claim elements.

Rather, as argued above with respect to claims 1 and 15, Sloman et al. simply verify capture of a first chamber in response to a stimulation pulse by measuring a far-

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field response of that pulse. Further, Dahl et al. determine geometric changes in a heart based upon flexures in a cardiac lead or through ultrasonic measurements. However, neither Sloman et al. or Dahl et al. disclose or suggest circuitry that is operative to sense a potential at one electrode position that is generated by a electrical signal delivered at a different electrode position, and determine a parameter based, at least in part, on the sensing wherein the parameter relates to cardiac geometry as recited in claim 19 of the present application. Accordingly, Applicants respectfully submit that claim 19 is novel and non-obvious over Sloman et al. and Dahl et al. and is allowable. Applicants further submit that claims 20-21 that depend from claim 19 are allowable as is claim 19 and for additional limitations recited therein.

The Examiner rejected claim 13 under 35 U.S.C §103(a) as being unpatentable over Sloman et al. in view of Dahl et al. and further in view of U.S. Patent No. 6,438,408 to Mulligan et al. Applicants respectfully traverse this rejection.


In view of the foregoing analysis of independent claim 1 over Sloman et al. in view of Dahl et al., Applicants believe that the rejections of dependent claim 13 under §103 is rendered moot as claim 13 depends from allowable independent claim 1. Applicant, therefore, requests withdrawal of the rejection of claim 13 under 35 U.S.C. § 103(a).

In light of the above claim amendments and remarks, it is respectfully submitted that the application is in condition for allowance; and an early notice of allowance is requested.

Respectfully submitted,

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Date



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